

We Claim:

1. A spark plug comprising:

a central electrode;

a metal shell;

5 an alumina ceramic insulator disposed between the center electrode and the metal shell, wherein at least part of the surface of the insulator is covered with a glaze layer comprising oxides,

wherein the glaze layer comprises:

10 1 mol% or less of a Pb component in terms of PbO;

35 to 55 mol% of a Si component in terms of SiO₂;

15 to 35 mol% of a B component in terms of B₂O₃;

5 to 20 mol% of a Zn component in terms of ZnO;

0.5 to 20 mol% in total of at least one of Ba and Sr components

15 in terms of BaO and SrO, respectively; and

10 to 15 mol% in total of at least one of alkaline metal components of Na, K, and Li in terms of Na₂O, K₂O, and Li₂, respectively.

20 2. The spark plug according to claim 1, wherein the glaze layer contains the K component and at least two alkaline metal components among the Li, Na and K components, and satisfies the relationship: $0.4 < \text{NK}_2\text{O}/\text{NR}_2\text{O} < 0.8$ when the at least two alkaline metals are taken as R, NR₂O is a total mol content of

25 the at least two alkaline metal components in terms of a

composition formula R_2O , and NK_2O is a mol content of the K component in terms of K_2O .

3. The spark plug according to claim 1, wherein the glaze layer contains the Li component and at least two alkaline metal components among the Li, Na and K components, and satisfies the relationship: $0.2 < NLi_2O/NR_2O < 0.5$ when the at least two alkaline metal components are take as R, NR_2O is a total mol content of the at least two alkaline metals in terms of a composition formula R_2O , and NLi_2O is a mol content of the Li component in terms of L_2O .

4. The spark plug according to claim 1, wherein the glaze layer further comprises a B component and a Zn component in terms of B_2O_3 and ZnO , respectively, in a total mol amount of $N(B_2O_3 + ZnO)$,

the glaze layer further comprises at least one of: an alkaline earth metal component RE, RE being at least one selected from Ba, Mg, Ca and Sr, in terms of a composition formula REO ; and an alkaline metal component R, R being at least one selected from Na, K and Li, in terms of a composition formula R_2O , in a total mol amount of $N(RO + R_2O)$, and

the ratio: $N(B_2O_3 + ZnO)/N(RO + R_2O)$ is 1.5 to 3.0.

5. The spark plug according to claim 1, wherein the glaze

layer contains 8 to 30 mol% in total of the Zn component and the at least one of Ba and Sr components in terms of ZnO, BaO and SrO, respectively.

5 6. The spark plug according to claim 1, wherein the glaze layer further comprises 0.5 to 5 mol% in total of at least one of Zr, Ti, Mg, Bi, Sn, Sb and P in terms of ZrO₂, TiO₂, MgO, Bi₂O₃, SnO₂, Sb₂O₅ and P₂O₅, respectively.

10 7. The spark plug according to claim 1, which comprises one of: a terminal metal fixture and the center electrode as one body, in a through hole of the insulator; and a terminal metal fixture and the center electrode provided separately from the center electrode via a conductive bonding layer, in a through
15 hole of the insulator, and

an insulation resistant value is 200 MΩ or more, which is measured by keeping the whole of the spark plug at about 500°C and passing a current between the terminal metal fixture and the metal shell via the insulator.

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8. The spark plug according to claim 1, wherein the insulator comprises an alumina insulating material containing 85 to 98 mol% of an Al component in terms of Al₂O₃, and the glaze layer has an average thermal expansion coefficient at the
25 temperature ranging 20 to 350°C of $5 \times 10^{-6}/^{\circ}\text{C}$ to $8.5 \times 10^{-6}/^{\circ}\text{C}$.

9. The spark plug according to claim 1, wherein the glaze layer has a softening point of 600 to 700°C.